WHAT IS CLAIMED IS:

1. A metallic surface identifying sensor comprising:

a magnetic pole portion for detection which shifts facing a surface of a magnetic body to be identified having an uneven shape wherein the distance from said surface to be identified changes along with said uneven shape while shifting;

a reference magnetic pole portion which is placed across from a reference surface, wherein the distance from said reference surface to said magnetic pole portion is maintained approximately constant regardless of the shifting of said magnetic pole portion for detection in relation with said surface to be identified;

magnetizing coils which are separately wound around said magnetic pole portion for detection and said reference magnetic pole portion to generate magnetic fluxes; and

detecting coils which are separately wound around said magnetic pole portion for detection and said reference magnetic pole portion to detect said magnetic fluxes wherein said uneven shape of said surface to be identified of said metallic body is detected based on detection outputs from said magnetic pole portion

2. A metallic surface identifying sensor according to Claim 1, wherein:

said magnetic pole portion for detection is placed across from said surface to be identified of said metallic body with a space for detection therein wherein the size of said space for detection changes according to said uneven shape during the shift; and

said reference magnetic pole portion is placed across from said reference surface having a flat surface with a reference space therein wherein the measurements of said reference space are maintained approximately constant regardless of the shift.

3. A metallic surface identifying sensor according to Claim 1, wherein said reference surface which is formed on a reference metallic body and said metallic body having said surface to be identified have an identical resistivity value

4. A differential magnetism sensor apparatus comprising:

a magnetizing coil which generates a closed loop magnetic field,

a differential detecting coil which detects a variation of a magnetic flux passing through said magnetizing coil, and

a differential amplifying device which amplifies a difference between two outputs from ends of said differential detecting coil and outputs the amplified difference as a differential output;

wherein said differential magnetism sensor apparatus further comprises a demodulating device which demodulates each of said two outputs from said differential detecting coil and a low-pass filter which removes a high-frequency constituent from each of two outputs from said demodulating device, said two outputs from said differential detecting coil pass through said demodulating device and said low-pass filter and are input to said differential amplifying device.

5. A differential magnetism sensor apparatus according to Claim 4, wherein at least both of said magnetizing coil and said differential detecting coil are sealed with a resin.

6. A coin identifying apparatus comprising:

a coin transferring path on which a coin to be detected is transferred along a guide while being held on a moving surface;

a first detecting sensor which is positioned on said coin transferring path and which detects data regarding the material or the thickness of said coin;

a second detecting sensor which detects data regarding the diameter of said coin;

a third detecting sensor which detects at least one of the following: data regarding unevenness on the surface of said coin, data regarding unevenness on the side of said coin, and data regarding unevenness at the edge of said coin; and

an identifying means which identifies said coin based on output signals from said first, second and third detecting sensors;

wherein said identifying means provides a temporary decision on said coin to be detected based on outputs from said first detecting sensor and said second detecting sensor and identifies said coin based on the output from said third detecting sensor while considering said temporary decision.

7. A magnetic sensor body comprising:

a coin transferring path on which a coin to be detected is transferred along a guide while being held on a moving surface;

a first detecting sensor which is positioned on said coin transferring path and which detects data regarding the material or the thickness of said coin;

a second detecting sensor which detects data regarding the diameter of said coin; and

a third detecting sensor which detects at least one of the following: data regarding unevenness on the surface of said coin, data regarding unevenness on the side of said coin, and data regarding unevenness at the edge of said coin;

wherein said magnetic sensor body identifies said coin by using said first, second and third detecting sensors which are integrated by a mold;

wherein said first detecting sensor is configured such that it is shaped as a "U", said coin transferring path is formed between two free ends, each of said free ends has a projecting portion which projects toward said coin transferring path, and a magnetizing coil and a detecting coil are wound around said projecting portion;

wherein said second detecting sensor is configured such that it is shaped as a "] (U)", said coin transferring path is formed between two free ends, and a magnetizing coil and a detecting coil are wound around a connecting portion which is positioned opposite from said free ends; and

wherein said third detecting sensor is placed in the vicinity of said guide on said coin transferring path.

8. A magnetic sensor body according to Claim 7 comprising two pairs of said first detecting sensors and said second detecting sensors wherein said two pairs of said first detecting sensors and said second detecting sensors are designated to be a detecting magnetic sensor, which detects said coin, and a reference magnetic sensor, which detects a sample for comparison, wherein said

coin is detected based on the output from said detecting magnetic sensor and said reference magnetic sensor.

9. A magnetic sensor body according to Claim 8, wherein said magnetic sensor body has a mount portion on which said sample for comparison is mounted for being replaced with another for detection.

10. A magnetic sensor shaped as a "] (U)" and having projecting portions such that two free ends face each other wherein a magnetizing coil and a detecting coil are wound around each of said projecting portions and a metallic body is detected while passing between said projecting portions.

11. A magnetic sensor according to Claim 10, wherein said two free ends of said "] (U)"-shaped magnetic sensors are paired and one is a detecting magnetic sensor which detects said metallic body while the other one is a reference magnetic sensor such that said metallic body is detected based on outputs from said detecting magnetic sensor and said reference magnetic sensor.

12. A magnetic sensor shaped as a "] (U)" having a magnetizing coil and a detecting coil wound around a connecting portion opposite from two free ends and a metallic body to be detected sandwiched between said two free ends.

13. A magnetic sensor according to Claim 12, wherein the sensor has a slant such that space between said two free ends narrows towards ends of said two free ends.

14. A magnetic sensor according to Claim 13, wherein said two free ends of said "] (U)"-shaped magnetic sensors are paired and one is a detecting magnetic sensor which detects said metallic body while the other one is a reference magnetic sensor such that said metallic body is detected based on outputs from said detecting magnetic sensor and said reference magnetic sensor.

15. A coin identifying sensor comprising first and second detecting sensor portions which detect data regarding the diameter on both sides of a coin transferred along a guide wherein:

said first and second detecting sensor portions are formed such that their cross sections are shaped as an "E";

free ends of said E-shaped first and second detecting sensor portions face each other;

a magnetizing coil and first and second detecting coils are wound around said first and second detecting sensor portions;

said magnetizing coils of said first and second detecting sensor portions are connected in series while said first and second detecting coils are connected in phase; and

said first detecting coil and said second detecting coil are configured to be differential.

16. A coin identifying sensor comprising:

a first detecting sensor portion having a detecting magnetic sensor comprising a cross section shaped as a "U" wherein a coin is transferred along a guide between free ends of the U-shaped detecting magnetic sensor, and a reference magnetic sensor which has a shape identical to said detecting magnetic sensor; said first detecting sensor portion detects data regarding the diameter on one side of said coin transferred along said guide; and

a second detecting sensor portion configured identical to said first detecting sensor portion and is placed such that free ends of said detecting magnetic sensors of said first and second detecting sensor portions face each other wherein said second detecting sensor portion detects data regarding the diameter on the other side of said coin;

wherein a magnetizing coil and first and second detecting coils are wound around said first and second detecting sensor portions; said magnetizing coil of said first and second detecting sensor portions are connected in series while said first and second detecting coils are connected in phase; and said first detecting coil and said second detecting coil are configured to be differential.

17. A coin identifying sensor in comprising first and second thickness detecting sensor portions placed at both ends of a coin transferred along a guide wherein each of said first and second thickness detecting sensor portions comprise a combination of sensor bodies having a "] (U)"-shaped cross section wherein:

said first thickness detecting sensor portion is placed in the vicinity of one side of said coin in the thickness direction while said second thickness detecting sensor portion is placed in the vicinity of the other side of said coin;

magnetizing coils and first and second detecting coils are wound around said first and second thickness detecting sensor portions; and

said magnetizing coils of said first and second thickness are connected in series and said first detecting coil and said second detecting coil are connected in phase and are configured to be differential.

18. A coin identifying sensor according to Claim 17, wherein said coin has edges which are positioned unbalanced in relation to magnetic poles of said first thickness detecting sensor portion and said second thickness detecting sensor portion.

19. A coin identifying sensor according to Claim 17, wherein said first thickness detecting sensor portion and said second thickness detecting sensor portion are placed at a point symmetrical from each other.

20. A displacement sensor having a configuration in which an output changes corresponding to a change in the relative position to an object to be detected and which detects a proximity position in relation to said object to be detected based on the change in said output wherein:

magnetizing coils and detecting coils are wound around a core body such that they are lined on the axis of said core body;

one end of each of said magnetizing coils and said detecting coils are placed at a core center portion at the approximate center of said core body in the axial direction while the other ends of magnetizing coils and detecting coils are placed at a pair of core end portions at each end of said core body in the axial direction; and

the axial direction of said core body is arranged to be approximately equal to the direction of a change in the relative position in relation to said object to be detected such that one of said core end portions and said object to be detected face each other when said object to be detected approaches and retreats from said core end portion.

21. A displacement sensor according to Claim 20, wherein said core body is formed of a piece of a plate.

22. A displacement sensor according to Claim 20, wherein the width of said core end portion in the direction perpendicular to the axial direction is smaller than the width of said core center portion.

23. A displacement sensor according to Claim 20, wherein said magnetizing coils have a pair of wound portions which are positioned such that opposed magnetic fields are generated on said axis of said core body.

24. A proximity sensor which detects the location of an object to be detected without touching the object, comprising:

two magnetizing portions each of which includes a magnetizing core and a magnetizing coil wound around the magnetizing core and which are disposed at a predetermined interval,

a magnetism detecting portion which includes a detecting core and a detecting coil wounded around the detecting core and which is disposed between said two magnetizing portions,

wherein said two magnetic portions generate a flux path which passes said object to be detected and a flux path which passes said magnetism detecting portion, and

wherein the variation of the magnetic flux of the flux path which passes said object to be detected corresponding to a variation of the location of said object to be detected varies the magnetic flux of the flux path which passes said magnetism detecting portion, and the location of said object to be detected is detected by means of a variation of the output of the detection from said magnetism detecting portion.

25. A proximity sensor according to Claim 24, comprising two magnetism detecting portions, each of which is disposed on a going path and returning path of the magnetic flux between said two magnetizing portions, respectively, the detecting coil of each of said two magnetism detecting portions are wired so that a differential output between said two magnetism detecting portions is output, and the location of the object to be detected is detected by means of the differential output.

26. A proximity sensor according to Claim 24, wherein each of said magnetizing cores of said magnetizing portions and the detecting core are magnetically separated from each other.

27. A proximity sensor according to Claim 24, wherein each of said magnetizing cores of said magnetizing portions is a thin plate and has the same rectangular shape, and the detecting core is a thin plate and has a rectangular shape.